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TITLE OF THE INVENTION

Retractable Leash Device

APPLICANTS

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CROSS REFERENCE TO RELATED APPLICATIONS

We claim the benefit of provisional patent application 60/473,307 filed on 27 May 2003.

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The invention broadly relates to retractable leash devices.

2. Prior Art:

A retractable leash device is typically comprised of a leash wound around a spring loaded reel inside a housing with a handle. A connector at the outer end of the leash is connectable to a collar on an animal, such as a dog. The leash may be extended or retracted.

The dog's owner may occasionally wish to tether the dog to a fixed object, such as a pole, and leave the dog alone for a while. This may be done by disconnecting the leash from the collar, wrapping the leash around the object, positioning the leash through the loop shaped handle, and reconnecting the leash to the collar. Alternatively, the leash near the housing may be simply tied

1 around the object with a knot. Both methods are inconvenient, and the tying method is
2 unreliable.

3 The leash is spring loaded to maintain tension on the leash at all times to eliminate slack to avoid
4 tangling and dragging on the ground. A momentary lock and a toggle lock are provided for
5 controlling retraction. The momentary lock prevents the leash from extending or retracting when
6 actuated and frees the leash for extension and retraction when released. The toggle lock prevents
7 extension or retraction when toggled to the lock position without constant finger pressure. Some
8 prior art leashes have separate momentary and toggle locks, and some have combined locks.

9 When the leash is free to extend or retract, the user has little control over the length of the leash.
10 Shortening the leash requires a cumbersome process which includes extending the user's arm to
11 position the housing closer to the dog, actuating the momentary lock, pulling the dog closer, and
12 releasing the lock to retract the leash. The process is repeated until the leash is retracted the
13 desired amount.

14 Another disadvantage of prior art retractable leash devices is uncontrolled retraction speed.
15 When the leash is not connected to the dog and the locks are not engaged, the leash is retracted at
16 high speed into the housing. The metal connector at the end of the leash is whipped around
17 during retraction and may strike the user.

18 BRIEF SUMMARY OF THE INVENTION

19 Objects of the present retractable leash device are:

- 20 • to tether an animal to its owner with a leash;
- 21 • to tether the animal to a fixed object without having to disconnect leash from animal or tying
22 the leash around the object with a knot;
- 23 • to secure accessories such as poop bags, animal toys, etc.;
- 24 • to be attachable to the clothing of the user for hands free use;

- 1 • to automatically maintain tension on the leash to eliminate slack;
- 2 • to enable stopping the leash from extension but allowing retraction to maintain tension;
- 3 • to enable stopping the leash from extension or retraction without human input; and
- 4 • to slow leash retraction for avoiding whiplash.

5 The retractable leash device is comprised of a housing with a handle, a reel in the housing, a
6 leash wound around the reel and extendable from the housing, and a spring biasing the reel to
7 retract the leash. A momentary unidirectional lock in the housing is comprised of a hinged and
8 spring loaded lever with an inner end biased away from the reel, and an outer end projecting
9 from the handle. A hinged and spring loaded ratchet adjacent the inner end of the lever is biased
10 by the lever to a normally disengaged position away from the reel. When the lever is pressed, its
11 inner end is moved to pivot ratchet into engagement with unidirectional teeth on the reel to
12 prevent rotation in the release direction, but permit rotation in the retract direction. A toggle lock
13 positioned in the housing is comprised of a sliding bar with an inner end movable between an
14 unlocked position away from the reel, and a locked position between cogs on the reel. A geared
15 rotation damper is engaged with a gear around the reel to limit retraction speed. A clip on the
16 housing is comprised of a notch in the housing, and a gate spanning the opening of the notch for
17 clipping around the leash.

18 BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

19 Fig. 1 is a side view of the retractable leash device.

20 Fig. 2 is a side cutaway view thereof in an unlocked condition.

21 Fig. 3 is a side cutaway view thereof with a momentary unidirectional lock engaged.

22 Fig. 4 is a side cutaway view thereof with a toggle lock engaged.

- 1 Fig. 5 shows the retractable leash tethered to a tree.
- 2 Fig. 6 shows the retractable leash tethered to a fence.
- 3 Fig. 7 shows an alternative clip.
- 4 Fig. 8 shows another alternative clip.
- 5 Fig. 9 shows a leash securing device for making a loop of a fixed length in the leash.

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DRAWING REFERENCE NUMERALS

7	10. Housing	11. Handle
8	12. Leash	13. Momentary unidirectional lock
9	14. Toggle Lock	15. Clip
10	16. Slot	17. Notch
11	18. Gate	19. First End
12	20. Second End	21. Reel
13	22. Spring	23. Inner End
14	24. Spring	25. Outer End
15	26. Ratchet	27. Spring
16	28. Ramp	29. Tooth
17	30. Outer End	31. Sliding Bar
18	32. Inner End	33. Cog
19	34. Rotation damper	35. Gear
20	36. Fixed Object	37. Fixed Object
21	38. Housing	39. Clip
22	40. Notch	41. Gate
23	42. Housing	43. Clip

- | | | |
|---|---------------------------|------------------|
| 1 | 44. Handle | 45. Grip |
| 2 | 46. Leash Securing Device | 47. Teethed Slot |

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4 DETAILED DESCRIPTION OF THE INVENTION

4 Fig. 1

5 A preferred embodiment of a retractable leash device shown in Fig. 1 is comprised of a housing
6 10 with a handle 11, a leash 12 extending from housing 10, a momentary unidirectional lock 13
7 projecting from housing 10, a toggle lock 14 projecting housing 10, and a clip 15 on housing 10.

8 Leash 12 is positioned through a U-shaped slot 16 in housing 10. Momentary unidirectional lock
9 13 is preferably positioned on an inner side of handle 10 to facilitate finger actuation, and toggle
10 lock 14 is preferably positioned at an outer side of handle 10 to facilitate thumb actuation. In this
11 example, clip 15 is comprised of a notch 17 in housing 10 and a hinged gate 18 spanning notch
12 17. A proximal end of gate 18 is hinged to a first side 19 of notch 17, and a distal end of gate 18
13 is snugly engaged behind a recurved second side 20 of notch 17 so that gate 18 can only open
14 inward.

15 Fig. 2

16 The retractable leash device is shown in a cutaway view in Fig. 2. The inner portion of leash 12
17 is wound around a rotary reel 21 inside housing 10. Reel 21 is biased by a spring 22 in a
18 direction to automatically retract leash 12.

19 Momentary unidirectional lock 13 is comprised of a hinged lever 30 with an inner end 23 biased
20 by a spring 24 away from reel 21, and an outer end 24 projecting from handle 11. A hinged
21 ratchet 26 adjacent inner end 23 of lever 14 is biased by lever 14 to a normally disengaged

1 position away from reel 21. Ratchet 26 is biased by a spring 27 towards reel 21, but spring 27 is
2 weaker than spring 24, so that ratchet 26 is biased to the disengaged position against spring 27.
3 A ramp 28 is positioned on an inner side of ratchet 26 for engaging directional teeth 29 around
4 reel 21 that are angled toward ratchet 26.

5 Toggle lock 14 is comprised of a sliding bar 31 with an inner end 32 movable between a
6 disengaged position away from reel 21, and a locked position between cogs 33 on reel 21. A grip
7 45 on sliding bar 31 is positioned through housing 10.

8 A geared rotation damper 34 is engaged with a gear 35 concentrically positioned around reel 21
9 to limit retraction speed and prevent whiplash if leash 12 is inadvertently released for free
10 retraction. Rotation damper 34 is preferably attached to the side of housing 10 which is omitted
11 in this view. Alternative rotary damping devices for limiting retraction speed include dampening
12 grease, a controlled friction device such as a variable force clutch, an air resistance damping
13 device with fins, etc.

14 Momentary unidirectional lock 13 and toggle lock 14 are normally disengaged as shown. Reel
15 21 is free to rotate in either direction for extending or retracting leash 12 as the animal at the end
16 of leash 12 moves away or towards the leash device. Leash 12 is kept taut by spring 22 to
17 eliminate slack.

18 Fig. 3

19 Momentary unidirectional lock 13 is engaged in Fig. 3. When outer end 25 of lever 30 is pressed,
20 inner end 23 is moved toward reel 21 and ratchet 26 is biased by spring 27 toward reel 21. Ramp
21 28 under ratchet 26 is moved into engagement with unidirectional teeth 29 on reel 21 to prevent
22 reel 21 from rotating in the release direction and thus prevent the animal from moving farther
23 away. When the animal moves closer to the leash device, unidirectional teeth 29 on reel 21 are
24 able to slide past ratchet 26 to permit rotation in the retraction direction and thus retract leash 12

1 to eliminate slack. Ratchet 26 is positioned on top of lever 30 so that ratchet 26 may be pivoted
2 by teeth 29 without moving lever 30.

3 Instead of ratchet 26 movable into engagement with directional teeth 29 on reel 21, momentary
4 unidirectional lock 13 may be comprised of other devices, such as roller clutches, one-way
5 clutches, etc.

6 Fig. 4

7 Toggle lock 14 is engaged in Fig. 4. Momentary unidirectional lock 13 is disengaged. Forked
8 inner end 32 of sliding bar 31 is slid toward reel 21 and positioned between cogs 33 on either
9 side of reel 21 to prevent rotation in either direction. Sliding bar 31 has no spring loading so that
10 it stays in its selected position without human input.

11 Figs. 5-6

12 The leash device is shown in Fig. 5 tether to a fixed object 36, such as a tree, for leaving the
13 animal alone. Toggle lock 14 is engaged to prevent leash 12 from retracting or extending. Leash
14 12 is wrapped around object 36 and positioned inside clip 15. The leash device is shown in Fig. 6
15 tether to a fixed but relatively thin object 37, such as a wire fence, by engaging toggle lock 14
16 and clipping object with clip 15. Clip 15 may also be clipped to the clothing of the user for hands
17 free use. Clip 15 may also be used for securing accessories such as poop bags, animal toys, etc.

18 Figs. 7-8

19 An alternative embodiment of the leash device is shown in Fig. 7. It is comprised of a dog's head
20 shaped housing 38. A clip 39 is comprised of an open mouth shaped notch 40 with a hinged gate
21 41 pivoted to the upper part of notch 40. Another alternative embodiment shown in Fig. 8 is

1 comprised of a housing 42 a separate clip 43 attached to a hole 44, such as the loop defined by a
2 handle 45. Clip 43 may be comprised of a karabiner.

3 Fig. 9

4 Fig. 9 shows a leash securing device 46 for making a loop of a fixed length in leash 12. When
5 leash 12 is wrapped around a fixed object and secured to clip 15, an intermediate portion of leash
6 12 is secured in leash securing device 46 to fix the length of the loop formed around fixed object.
7 Therefore, leash 12 is prevented from tightening around the fixed object, and allowed to rotate
8 around the fixed object when the animal walks around the fixed object to avoid having leash 12
9 wrapped more and more around the fixed object.

10 In this example leash securing device 46 is comprised of a teathed slot 47 inside notch 17 within
11 which leash 12 is wedged. Alternatively, leash securing device 46 may be comprised of a spring
12 loaded grip which grips leash 12, holes in leash 12 and a pin attached to housing for mating with
13 one of the holes, etc.

14 Although the foregoing description is specific, it should not be considered as a limitation on the
15 scope of the invention, but only as an example of the preferred embodiment. Many variations are
16 possible within the teachings of the invention. Therefore, the scope of the invention should be
17 determined by the appended claims and their legal equivalents, not by the examples given.